CLAIMS

1. A mutant prenyl diphosphate synthase having a modified amino acid sequence, wherein

at least one amino acid residue selected from (a) the amino acid residues in between the amino acid residue located at the fifth position in the N-terminal direction from D of the N-terminal and the amino acid residue located at the first position in the N-terminal direction from D of said N-terminal of the aspartic acid-rich domain DDXX(XX)D (wherein X denotes any amino acid, and the two X's in the parentheses may not be present) present in region II, and (b) the amino acid residue located at the first position in the N-terminal direction from D of the C-terminal of said aspartic acid-rich domain has been substituted by another amino acid, and/or

additional amino acid(s) have been inserted in between the amino acid residue located at the first position in the N-terminal direction from D of the C-terminal and D of the C-terminal of said aspartic acid-rich domain.

2. A mutant enzyme according to claim 1 wherein the reaction product of the prenyl diphosphate synthase is farnesyl diphosphate.

3. A mutant enzyme according to claim 1 wherein the prenyl diphosphate synthase is of the homodimer-type.

4. A mutant enzyme according to claim 1 wherein the prenyl diphosphate synthase is derived from archaea.

5. A mutant enzyme according to claim 1 wherein the prenyl diphosphate synthase is derived from Sulfolobus acidocaldarius.

6. A mutant enzyme according to claim 1 wherein the prenyl diphosphate synthase retains the properties that were owned by the prenyl diphosphate synthase prior to mutation.

7. A mutant enzyme according to claim 1 wherein the prenyl diphosphate synthase is a thermostable enzyme.

8. A mutant prenyl diphosphate synthase according to claim 1, wherein at least one amino acid selected from phenylalanine at position 77, threonine at position 78, valine at position 80, histidine at position 81, and isoleucine at position 84 has been substituted by another amino acid, or one or more amino acids have been inserted in between isoleucine at position 84 and methionine at position 85 in the geranylgeranyl diphosphate synthase as set forth in SEQ ID No: 1.

9. A mutant prenyl diphosphate synthase according to claim 1 wherein at least one amino acid selected from phenylalanine at position 77, threonine at position 78, valine at position 80, histidine at position 81, and isoleucine at position 84 has been substituted by another amino acid, and/or two amino acids have been inserted in between isoleucine at position 84 and methionine at position 85 in the geranylgeranyl diphosphate synthase as set forth in SEQ ID NO: 1, wherein the phenyl alanine at position 77 has been replaced with tyrosine, the threonine at position 78 has been replaced with phenylalanine or serine, the valine at position 80 has been replaced with isoleucine, the histidine at position 81 has been replaced with leucine or alanine, or the isoleucine at position 84 has been replaced with leucine; or proline and serine have been inserted in between the isoleucine at position 84 and the methionine at position 85.

10. A mutant prenyl diphosphate synthase according to claim 1, wherein the mutant prenyl diphosphate synthase is derived from a native geranylgeranyl diphosphate synthase of an organism selected from the group consisting of Arabidopsis thaliana, Lupinas albus, Capsicum annuum, Sulfolobus acidocaldarius, Rhodobactor sphaeroides, Rhodobactor capsulatus, Erwinia herbicola, Myxococcus thaliana and Neurospora crassa.

11. A DNA encoding an enzyme according to claim 1.

12. An RNA transcribed from a DNA according to

claim 11.

13. A recombinant vector comprising a DNA according to claim 11.

14. A host organism transformed with a recombinant vector according to claim 13.

15. A process for producing a mutant enzyme according to claim 14, said method comprising the steps of culturing a host transformed with an expression vector comprising a DNA coding for the mutant enzyme and of harvesting the expression product from the culture.

16. A process for producing a prenyl diphosphate having not more than 15 carbons comprising the step of bringing an enzyme according to any of claims 1 to 10 or an enzyme produced by the method according to claim 15 into contact with a substrate selected from the group consisting of isopentenyl diphosphate, dimethylallyl diphosphate, and geranyl diphosphate.